

the theory still further, Dulong attempted, by reversing the process of Laplace, to deduce the coefficient by which the Newtonian formula is to be multiplied, directly from experiments themselves. The object of the present paper is to compare the investigation of Dulong with the experiments on the velocity of sound made by Drs. Moll and Van Beek, of which an account was lately published in the *Philosophical Transactions*. By applying the values of the coefficients thus obtained, the computed velocities of sound came out much nearer to the observed velocities; and the author concludes by remarking, that such differences as yet remain between calculation and experiment, may with great probability be ascribed to the errors, which are unavoidable in observations of so complicated a nature.

*On the Elasticity of Threads of Glass, with some of the most useful Applications of this property to Torsion Balances.* By William Ritchie, A.M. F.R.S., Rector of the Royal Academy of Tain. Read March 18, 1830. [*Phil. Trans.* 1830, p. 215.]

The author proposes the employment of threads of glass in the construction of torsion-balances, in place of the silver wire, used by Coulomb for the measurement of minute electric or magnetic forces. He describes a galvanometer of his invention, acting upon this principle, the intensity of the galvanic current being measured by the torsion of a slender filament of glass, to the lower end of which a magnetized needle is fixed at right angles. He also applies the same power to the improvement of the sensibility of the common balance for weighing minute bodies, by affixing to the beam a long glass thread horizontally in the axis of suspension, by the torsion of which, when the balance has been brought nearly to a level, the more accurate adjustments are to be effected. On the whole he considers that glass, from its perfect elasticity, possesses decided advantages over metallic wires, for the construction of instruments acting on the principle of torsion.

*Memoir on the occurrence of Iodine and Bromine in certain Mineral Waters of South Britain.* By Charles Daubeny, M.D. F.R.S. Professor of Chemistry in the University of Oxford. Read May 6, 1830. [*Phil. Trans.* 1830, p. 223.]

The author lays claim to being the first who announced to the public the existence of bromine in the mineral springs of England; a discovery similar to that which had been previously made by others in many analogous situations on the Continent. His reason for offering the present communication to the Royal Society is, that he has examined on the spot a great number of mineral springs, and endeavoured to obtain, wherever it was practicable, an approximation to the proportion which iodine and bromine bear to the other ingredients. He has also aimed at forming an estimate of their comparative frequency and abundance in the several rock formations, an ob-

ject of considerable interest in geology, as tending to identify the products of the ancient seas in their most minute particulars with those of the present ocean. The results of his inquiries are given in the form of a table, in which the springs, whose waters he examined, are classified according to the geological position of the strata from which they issue, and of which the several columns exhibit the total amount of their saline ingredients; the nature and proportion of each ingredient, as ascertained by former chemists, or by the author himself; and lastly, where they contained either iodine or bromine, the proportions these substances bear to the quantities of water, and likewise to the chlorine also present in the same spring. He finds that the proportion of iodine to chlorine varies in every possible degree; and that even springs which are most strongly impregnated with common salt are those in which he could not detect the smallest trace of iodine. The same remark, he observes, applies also to bromine; whence he concludes, that although these two principles may, perhaps, never be entirely absent where the muriates occur, yet their relative distribution is exceedingly unequal. The author conceives that these analyses will tend to throw some light on the connection between the chemical constitution of mineral waters and their medicinal waters. Almost the only two brine springs, properly so called, which have acquired any reputation as medicinal agents, namely, that of Kreutznach in the Palatinate, and that of Ashby-de-la-Zouch in Leicestershire, contain a much larger proportion than usual of bromine, a substance, the poisonous quality of which was ascertained by its discoverer Balard. The author conceives that these two recently discovered principles exist in mineral waters, in combination with hydrogen, forming the hydriodic and hydrobromic acids, neutralized in all probability by magnesia, and constituting salts which are decomposable at a low temperature. He has no doubt that a sufficient supply of bromine might be procured from our English brine springs, should it ever happen that a demand for this new substance were to arise.

*Experiments to determine the Difference in the Number of Vibrations made by an Invariable Pendulum in the Royal Observatories of Greenwich and Altona. By Captain Edward Sabine, of the Royal Artillery, Sec. R.S. Read March 25, 1830. [Phil. Trans. 1830, p. 239.]*

The invariable pendulum, No. 12, with which the experiments recorded in this paper were made, was vibrated in the Royal Observatory at Greenwich in July 1828; in the Royal Observatory at Altona in September and October of the same year; and again at the Royal Observatory at Greenwich in August 1829. The mean of the results obtained at Greenwich in July 1828 and in August 1829, give the rate of this pendulum at Greenwich to be compared with its rate obtained at Altona. The details of all these series of observations are given in a tabulated form.